

# Industrial Energy Efficiency Project

In order to introduce a structured approach to energy management in operation, El-Dawleya for Modern Food Industries – Juhayna Group has joined hands with the GEF funded project, “Industrial Energy Efficiency in Egypt”. This project is implemented by the UNIDO in partnership with the Egyptian Environmental Affairs Agency, Ministry of Industry, Trade and SMEs and the Federation of Egyptian Industries. The project has helped El-Dawleya to implement Energy Management System in alignment with ISO 50001 for an overall improvement in energy efficiency and improve environmental impact.

## EGYPT

### A Case Study of El-Dawleya for Modern Food Industries – Juhayna Group

#### El-Dawleya EnMS Snapshot

**Industry:** Food Industries

**Location:** Industrial Zone, 6th of October City, Giza, Egypt

**Product:** fruit juice

of different concentrates and flavors

**Implementation cost:** ~0.216 MEGP

**EnMS Scope:** Electricity, natural gas & water

**Annual Energy savings:** ~7.6 GWh

**Annual water savings:** 126,000 m<sup>3</sup>

**Financial savings:** ~ 7.5 MEGP

**GHG reduction:** ~ 4,541 ton CO<sub>2</sub>eq.

**Overall payback:** ~5 years

**Objectives period:** 5 years

**EnMS Status:** ISO 50001 Awarded May 2018

**Time to implement EnMS:** 18 months

**El-Dawleya for Modern Food Industries Company**, member of Juhayna Dairy and Juice Industrial Group, produces 15,000 tons/ day (3 million packs/ year) of fruit juice of different concentrates and different flavors in packs of 200ml, 500ml and 1 liter. The plant is built over an area of 55'000 m<sup>2</sup> and employs 170 staff members.

The company is certified in ISO 14001, ISO 22000 and 22000 FSSC (Food Safety System Certificate), OHSAS 18001 and ISO 50001.



#### Implementing EnMS in El-Dawleya is the way out

Although El-Dawleya for Modern Food Industries uses state of the art technology of the field, the company management is striving for higher efficiency and optimized utilization of resources. Adoption of EnM has provided the management with the required tool to ensure the efficient use of energy and to identify, study and follow up energy saving opportunities; consequently, the framework to set objectives for the energy consumption. Applying the stringent procedures of EnMS to use energy efficiently contributes to confirming the leading competitive position of the company in the juice sector.

#### El-Dawleya ambitious EnMS objectives

Short term (2018)

- Electricity: reduce consumption by 10 % (base line 2015-2016)
- Natural gas: reduce consumption by 5 % (base line 2015-2016)
- Water: reduce consumption by 10 % (base line 2015-2016)

Long term (5 years)

- Reduce consumption of all resources 4 % each year.

#### UNIDO, a key player in EnMS success at El-Dawleya

With EnMS training provided by UNIDO and support of the consultant delegated by IEE project, the company has started to quantify the energy users based on assumptions; since there were no sub-meters. UNIDO and the company management agreed to adopt a rather aggressive approach; where the energy team has been divided into three sub-teams: the first sub-team

to work on energy review and planning, the second to attack identification and studying of energy saving opportunities while the third worked on documentation of the system.

As soon as the energy review results were announced, followed by implementation of zero

## Saving opportunities

| Implemented Saving Opportunities |  |                   |                  |                         |              |                 |              |
|----------------------------------|--|-------------------|------------------|-------------------------|--------------|-----------------|--------------|
| S                                | Implemented Energy Saving Opportunities                                      | Elect Savings MWh | Fuel Savings MWh | Water S. M <sup>3</sup> | Savings MEGP | Investment MEGP | Payback Year |
| 1                                | Optimize compressor operation and apply proper maintenance                   | 3,145             | -                | -                       | 2.830        | 0.030           | 0.02         |
| 2                                | Increase efficiency of refrigeration and use high efficient chemical program | 350               | -                | -                       | 0.315        | 0.250           | 0.79         |
| 3                                | Increase steam recovery to boiler tank and fix insulations                   | -                 | 1,273            | -                       | 0.394        | 0.150           | 0.50         |
| <b>Total</b>                     |  | <b>3,495</b>      | <b>1,273</b>     | <b>-</b>                | <b>3.539</b> | <b>0.430</b>    |              |

| Identified and Planned Opportunities |   |                   |                  |                         |              |                 |              |
|--------------------------------------|---|-------------------|------------------|-------------------------|--------------|-----------------|--------------|
| S                                    | In-Progress Energy Saving Opportunities   | Elect Savings MWh | Fuel Savings MWh | Water S. M <sup>3</sup> | Savings MEGP | Investment MEGP | Payback Year |
| 1                                    | Removing PET line from production plan  | 800               | -                | -                       | 1.670        | 0.25            | 0.15         |
| 2                                    | Installing 2 Air tanks capacity 5 M3 to reduce compressors consumption  | 151               | -                | -                       | 0.136        | 0.25            | 1.84         |
| 3                                    | Adjusting cooling water temperature at refrigeration plant SCADA to reduce consumption  | 112               | -                | -                       | 0.101        | 0.15            | 1.48         |
| 4                                    | Connecting air conditioning plant with cooling water to reduce compressors A,C consumptions   | 26                | -                | -                       | 0.023        | 0.02            | 0.86         |
| 5                                    | Pasteurizers hibernation mode during standby circulation  | 458               | -                | -                       | 0.412        | 2.00            | 4.85         |
| 6                                    | Reduce Homogenizers Pressures (homogenizer valve)   | 401               | -                | -                       | 0.361        | 0.005           | 0.01         |
| 7                                    | Installing flash steam recovery<br>Install auto-flame panel to control boilers air to fuel ratios<br>Installing heat economizers at boilers | -                 | 693              | -                       | 0.215        | 0.65            | 5.00         |
| 8                                    | Replace normal lighting high bay 400W with led 150 W  | 213               | -                | -                       | 0.192        | 0.50            | 2.60         |
| 9                                    | Replace R.O station membranes to reduce water consumptions and increase productivity  | -                 | -                | 84,000                  | 0.588        | 0.600           | 1.00         |
| 10                                   | Use reject water after treatment  | -                 | -                | 42,000                  | 0.294        | 0.050           | 0.02         |
| <b>Total</b>                         |   | <b>2,161</b>      | <b>693</b>       | <b>126,000</b>          | <b>3.991</b> | <b>4.475</b>    |              |

## Barriers

During establishment and implementation of the system, plant management was highly committed to the project. The energy team was very competent and dedicated the right time and planning; therefore, no obstacles faced and project flowed smoothly to certification.

cost or no-cost energy saving measures, the benefits of EnMS manifested themselves as reduction on bills. The company has decided to install for an integrated system monitoring, measuring and recording of energy consumption of different processes withdrawn from newly installed 24 sub-meters.

## Lessons Learned

With the strong commitment of the company management coupled with dedicated competent energy team; work on the system started to yield early results which helped to keep the momentum and encouraged daring decision of installing monitoring and measuring system incorporating signals from more than 24 sub-meters.



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